RESECTION OF SPINAL ACCESSORY NERVE FOR TORTICOLLIS.

Dr. Robert G. Le Conte exhibited a boy of eleven upon whom he had operated six months previously for congenital torticollis. The patient's head, from birth, had been drawn to the right side, with the chin towards the right shoulder, and it was impossible for him to bring his face to the front. The right sternocleidomastoid muscle appeared to be twice as thick and strong as the left. With an anterior incision at the upper portion of the sternocleidomastoid the spinal accessory nerve was exposed before it entered the sternomastoid muscle. It was resected for a distance of half an inch.

The patient made an uneventful recovery, and now has perfect control and freedom of the motions of the head in all directions.

RUPTURE OF THE SPLEEN.

Dr. George G. Ross read a paper on Rupture of the Spleen, with Report of Cases, for which see page 66.

Dr. John H. Gibbon referred to a case of rupture of the spleen which he had reported before the Academy some years previous. He believed that localized tenderness and rigidity were the most valuable symptoms we have for locating the injured viscus. In nearly all of the cases of rupture of the spleen which have been reported there has been marked localized tenderness and rigidity. Dr. Gibbon believed that if the spleen were not so easily removed fewer splenectomies for rupture would be reported, since in the majority of these cases hemorrhage can be controlled by judicious packing. In order to control bleeding from large wounds of the spleen it may be necessary to crowd the spleen firmly up against the diaphragm. Dr. Gibbon believed that any case that lived for four or five days after the rupture had occurred could be saved without splenectomy.

END-TO-END ANASTOMOSIS OF THE BRACHIAL ARTERY.

Dr. Francis T. Stewart reported the following cases:

Case I.—A. L., aged 42 years, was admitted to the Pennsylvania Hospital June 14, 1905, in the service of Dr. Le Conte, to whom the author is indebted for the privilege of operating upon and reporting this case. The patient had been struck on the inner side of the arm just above the elbow with a piece of flying steel. The profuse bleeding which followed was readily controlled by pressure. Subsequently the arm became greatly swollen, the skin tense, and a number of large blisters appeared over the forearm. The radial pulse was absent. The X-ray showed the piece of steel, ⅜ x ⅛ inch in size, just beneath the skin. Two days after the injury a 5 inch incision was made along the inner side of the biceps, and the brachial artery exposed at the upper angle of the wound and compressed between the fingers of an assistant. The vessel was then traced downwards until the wound in its walls was found. The piece of steel was removed with the mass of clots which surrounded the artery. The wound in the artery was transverse and involved half of its circumference. One of the brachial veins had been severed, but was closed by agglutination of its walls the result of compression. After ligating the vein the arterial wound was sutured with through and through sutures of fine silk, which controlled the bleeding but also dangerously narrowed the lumen of the artery. The injured segment of the artery was therefore resected and an end-to-end anastomosis performed by the Murphy method. This necessitated flexion of the elbow, in which position the arm was dressed on an internal angular splint. The radial pulse had disappeared by the time the dressing was completed, but reappeared the following day, although very feeble. The wound was not drained, and primary union occurred. Two months after operation the forearm could be almost completely extended, the radial pulse was as strong as on the sound side, and there was some neuralgic pain along the course of the median nerve.

Case 2.—J. M., aged 32 years, was admitted to the Germantown Hospital, May 22, 1906, with a bullet wound on the inner side of the right arm just below the axilla. The following day the arm was greatly swollen and the radial pulse absent. The artery was exposed and compressed as in the preceding case, and a lacerated wound involving three-fourths of the circumference of the vessel found. As approximation of this wound obliterated the lumen of the vessel, the injured portion was resected, and the ends united with silk sutures passing through all the coats. After turning on the circulation a few additional sutures were applied to control the oozing. The wound was closed without drainage and healed by first intention. A feeble radial pulse could be felt immediately after the operation and this increased in strength from day to day. The bullet could not be found at the operation nor could it be shown by an X-ray plate.

Dr. Stewart said further that in addition to the above cases 8 others had been reported in which circular arteriorrhaphy had been performed for accidental wounds (1897, Murphy, Djemil Pacha, two cases; 1899, Kümmel, Krause; 1902, Fergusson; 1904, Delanglade; 1906, Brougham), not including cases of aneurysm. Of these 10 cases the axillary artery was involved in 3, the brachial in 2, the radial and ulnar (same patient) in 1, the femoral in 3, and the popliteal in 1. In 3 the wound was caused by a bullet, in 1 by a piece of steel, in 1 by a stab wound, and in 5 the vessel was accidentally opened during a surgical operation. The largest amount of vessel resected was 2 inches (femoral). In 7 cases the vessel was united with silk; in 3 the suture material was not mentioned. The Murphy method was employed in 8 cases and simple approximation in 2. In 5 cases the peripheral pulse could be felt at the close of the operation and in 5 it was absent immediately after the operation. Infection occurred in at least 3 cases and gangrene in 2 (femoral and popliteal). In no case was secondary hemorrhage or aneurysm reported.

At the present day ligation is contraindicated for a clean wound of a large artery. Unfortunately in the very cases in which arteriorrhaphy for wounds is most strongly indicated, *i.e.*, in those with chronic arteritis, in whom the danger of gangrene after ligation is much increased, the sutures are apt to tear out during the operation or thrombosis is likely to occur subsequently. Even in these cases, however, he believed arteriorrhaphy should be tried, since when one considers the probability of section of the vessel by a ligature, the dangers of suture are at least no greater than ligation, and in the event of thrombosis the patient is no worse off than after the application of a ligature; indeed if the thrombus forms slowly the collateral vessels may sufficiently dilate to prevent gangrene in the affected part.

Dr. John H. Gibbon thought that in Dr. Stewart's first case a prompt clot had formed at the site of anastomosis. This is indicated by the disappearance of the radial pulse before the patient left the operating table, and its gradual reappearance would indicate the establishment of collateral circulation. In this case the invagination method was employed which is now recognized as being faulty, because there is not a close contact between the intima of the two portions of the divided vessel. In Dr. Stewart's second case he did an end-to-end anastomosis with a close approximation of intima, and there was evidently no obstruction after the operation. Dr. Gibbon believes with Dr. Stewart that arteriorrhaphy is to be preferred to ligation wherever possible.

Dr. Stewart thought Dr. Gibbon's criticism was correct, and that thrombosis must have occurred in the first case. In his report he simply classed the cases according to whether the pulse was or was not present immediately after operation. Although his report shows that 8 of the 10 cases were done by the Murphy method, Dr. Stewart thinks there can be no doubt that the simple approximation, or the Carrel circular arteriorrhaphy is to be chosen by all means. He was at first going to say that he did his second case by the Carrel method, but was afraid Carrel might object as the edges were slightly inverted instead of everted, and he did not use the guide sutures of that surgeon.

Dr. Stewart thinks that the Murphy method is little used at the present day, although it was the pioneer one and paved the way for the progress which has been made along this line.

GUNSHOT INJURY OF THE LEFT HYPOGLOSSAL NERVE.

Dr. John B. Roberts reported this case, as follows:

A man was admitted to the Polyclinic Hospital on the 28th of March, 1907, with a gunshot wound of the left cheek over the ramus of the lower jaw. The point of entrance was about three-quarters of an inch below and about three-quarters of an inch in front of the lower edge of the lobe of the ear. The tongue when protruded pointed very much to the left (Fig. 1), showing that the hypoglossal nerve was paralyzed. The left side of the man's face was covered with sweat, and the left pupil slightly dilated suggesting irritation of the sympathetic nerve.

Dr. William G. Spiller examined the patient two days after his admission and supplied the following notes:

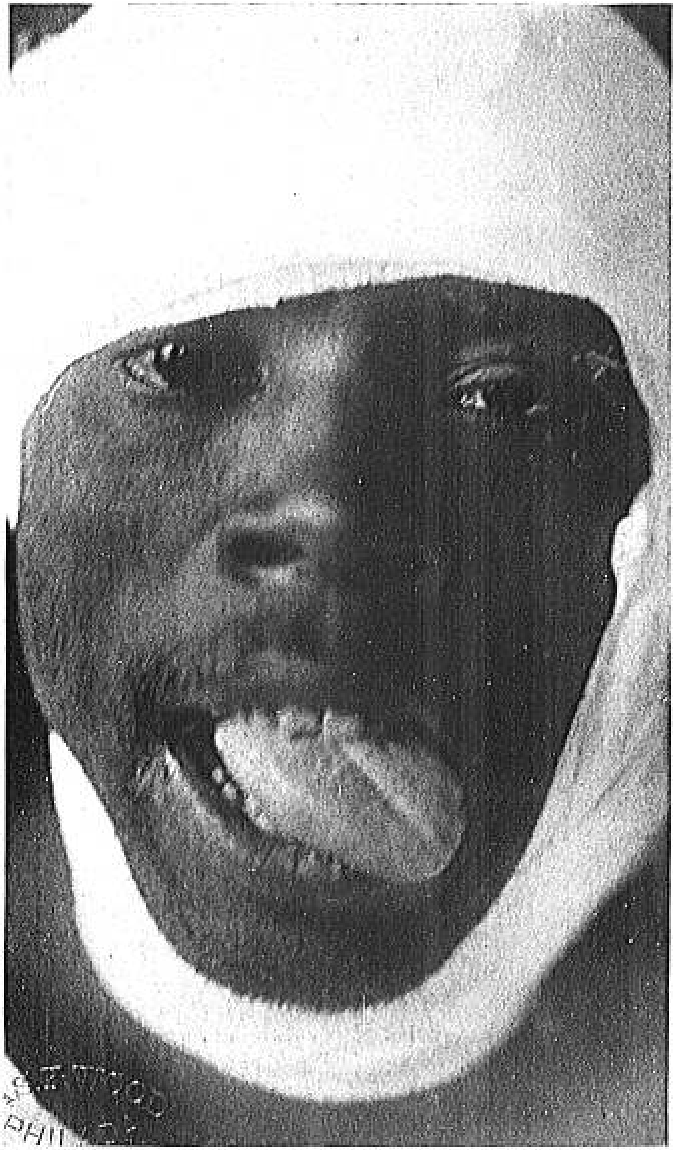
The left facial nerve is very paretic but not completely paralyzed. The upper branch of the nerve has probably escaped injury. The man can nearly close the lids of the left eye. The left side of the tongue is completely paralyzed. The organ while in the mouth deviates to the right, but is greatly deviated to the left when protruded. He is unable to move the tongue to the left, except a very little beyond the median line, unless it is protruded. This shows injury to the hypoglossal nerve. The soft palate is moved well on both sides when he says "Ah!" and is not paralyzed. He swallows fluids without difficulty when he is sitting up. The pneumogastric and glossopharyngeal nerves have probably escaped injury. The sympathetic has been injured.

He sweats profusely on the left side of the face. The sweating also extends down to the upper part of the shoulder and upper part of the left arm. The right side of the face is dry. The jaw is not deviated when his mouth is open (Fig. 2). The masseter muscles contract well on both sides. Sensations of touch and pain are normal on both sides of the face. Salt and sugar are both well tasted on the left side of the tongue. The grasp of the hands and the power of the legs are normal. There are no symptoms of involvement of the brain.

The left pupil is slightly dilated but seems to react to light.

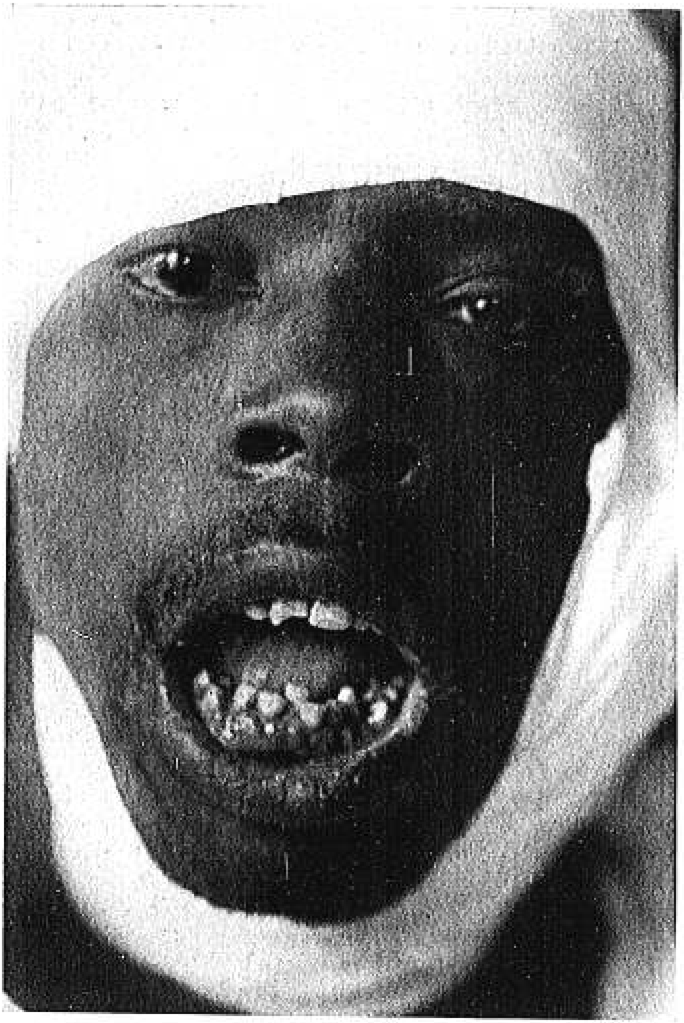
On April 3d, after locating the bullet by means of two X-ray pictures, Dr. Roberts operated for extraction of the missile. The wound in the cheek was suppurating, though it had been packed with iodoform gauze. The probe showed that the bullet had gone through the ramus of the mandible a short distance below the sigmoid notch. An incision was made around the angle of the jaw and the parotid gland pushed forward. By burrowing with a finger he was able to get behind the pharynx and explore the region in front of the first and second cervical vertebræ. He could feel distinctly the transverse portion of the first vertebra and with some manipulation was able to discover what seemed to be a foreign body, which was slightly movable, to the inner side of the mastoïd process in front of the second cervical vertebra. A porcelain tipped probe being introduced proved this to be lead. With forceps such as are used for cleft palate operations he was able to extract the ball. He then found that it had lain in a depression in front of the spinal column and that there were some small fragments of bone there. It is possible that these were pieces carried in from the perforation of the mandible. The space in which the ball lay was either the normal space between the first and second transverse processes or was a depression made by the bullet in the body of the second vertebra. The depth of the wound made it impossible to definitely determine whether the hypoglossal nerve at this point was actually divided, though it

FIG. 1.



Gunshot section of left hypoglossal nerve.

FIG. 2.



Gunshot injury of left hypoglossal nerve.

probably was cut close to the base of the skull. No attempt was made to suture it because of the danger of operating in such a region. The patient's favorable condition and the known rather unimportant results of hypoglossal injury were not such as to warrant interference.

When the man was admitted there was a good deal of difficulty in swallowing from want of control of the saliva; but at the time the operation was done he had gained fair control of these functions and the removal of the bullet seemed to be all that was indicated. The wound was treated by inserting a drainage-tube and packing.

The patient did well for a number of days. He had practically a normal temperature after a slight rise immediately subsequent to operation. On April 6th his temperature went up a little. On the 8th some moist râles in the upper part of the left lung could be heard. He complained of cough which had bothered him for about a day. The drainage-tube was withdrawn and the wound dilated, which evacuated a little fluid, and orders were given to wash the wound out with sterile salt solution twice a day. The drainage-tube was not returned, but the packing was continued. The next day his respiration was practically normal and the lung condition seemed to be better. His cough had been controlled apparently by occasional doses of five grains of ammonium carbonate and a sixteenth of a grain of codeine sulphate. The patient had been allowed for several days to sit up in bed and was advised to lie particularly on his left side to facilitate drainage.

Later sonorous râles were heard in the posterior part of the right chest. There was some tenderness on percussion of the left chest near the posterior edge of the left scapula, and a loss of resonance at the upper part of the right chest posteriorly. The gums were spongy, though no mercury had been taken to cause it. It was thought that possibly the bloody tinge of the expectoration might have come from this gingival condition. Bacteriological examination of the sputum showed the presence of pneumococcus, staphylococcus pyogenes aureus and bacillus proteus vulgaris. Urinary examination showed nothing abnormal. The temperature for a few days previous to this time and also at this time varied from 100° to 102°; the respirations from 24 to 28; the pulse from 90 to 100.

An examination of the chest made later by Dr. David Riesman showed that there was impaired resonance on the right side at the fourth and fifth interspaces over a limited area reaching to the axilla. Here crackling râles were heard with feeble breath-sounds and diminished fremitus. There was some pain in this region. The patient had had no chill and no night sweats, but was rapidly losing flesh. No tubercle bacilli were found in the sputum. His red blood cells were 2,150,000; white blood cells 26,200; hæmoglobin 85 per cent. The man was emaciated and weak, had a troublesome cough, and his throat seemed a good deal filled up with mucus. There was very little discharge from the original wound or the incision made foı the extraction of the bullet. At the end of the month further operation was suggested to explore the wound and to facilitate drainage, but the man declined to submit. By the 7th of May he was very much better and walking around the ward. On the 12th of May he left the hospital without permission, considering himself well enough to go.

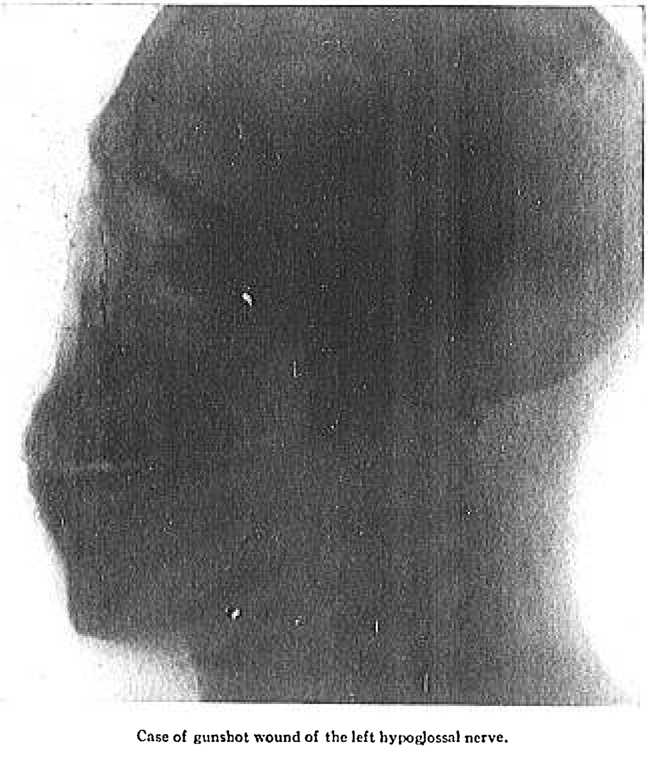
In July Dr. Roberts heard that the patient had been admitted to the tuberculosis wards of the Philadelphia General Hospital under the care of Dr. Ward Brinton. Dr. Brinton stated that tubercle bacilli had been found in the feces, but not in the sputum. There was, however, extensive pulmonary involvement. A few days later the patient died. The wounds in the neck and face had become healed. The Resident Physician, Dr. William Shields, had informed him the case was first thought to be one of gangrene of the lungs on account of the odor of the sputum. Tubercle bacilli were not found in the sputum nor was the streptothrix. At the autopsy six slides were taken from a cavity in the right lung and stained for tubercle bacilli but none were found.

The pathological diagnosis made was tuberculous bronchopneumonia. The pathologist was of the opinion that the gunshot wound of the neck involving the hypoglossal nerve had nothing to do with the lung condition.

The further notes of the autopsy, furnished by Dr. Shields, are as follows:

Right pleura firmly adherent from apex to base in midaxillary line. Slight adhesions of the left pleura in the region of the first and second ribs. The pericardium contained 60 c.c. of straw-colored fluid, and extended 7 cm. to right of midsternum.

Fig. 3.



Case of gunshot wound of the left hypoglossal nerve.

In the right pleural sac there were 300 c.c. of straw-colored fluid. Heart smaller than normal, but otherwise negative. Left lung slightly emphysematous and contained some œdematous fluid. Right lung was covered with thick pleura, both layers of which were firmly attached. Both lobes were firmly attached and showed tuberculous bronchopneumonia. The lower lobe contained three good-sized cavities in which was cheesy material. The two lower cavities communicate with a bronchus. The other organs show nothing of importance. The diagnosis was tuberculous brochopneumonia with chronic adhesive pleurisy.

Little doubt exists that in this case the hypoglossal nerve was divided. The dilated pupil and the unilateral sweating lead to the supposition that the sympathetic nerve was the seat of irritation. It is perhaps possible that the lids of the left eye suggested paresis of the facial nerve, when the real cause of their apparent loss of power was a slight protrusion of the eyeball due to sympathetic irritation. Division of the sympathetic would be expected to cause contraction of the pupil and sinking of the eyeball.

The location of the bullet in front of the second cervical vertebra near its transverse process on the left side corresponds with the upper part of the superior cervical ganglion of the sympathetic nerve. It is opposite this vertebra too that the hypoglossal nerve receives communicating branches from this sympathetic ganglion.

A missile dividing or destroying the hypoglossal nerve by pressure would be very likely to cause coincident irritation of the sympathetic ganglion in the same region. Had the patient lived, part of the spinal accessory nerve or the lingual branch of the trifacial nerve might have been transplanted into the distal part of the hypoglossal in order to restore motion to the left side of the tongue.

Dr. John H. Jopson referred to a case of injury of the median nerve of a peculiar type which he had recently encountered. The man had been struck on the inner side of the arm by a piece of steel scale while driving a bolt through a piece of sheet steel. An X-ray photograph showed a very small piece of steel located in the neighborhood of the brachial artery. The patient complained at this time of tingling or electrical sensations in the ring and little finger, on the palmar surface, or in other words, in the distribution of the ulnar nerve. Dr. Jopson saw him several days later and had a second X-ray plate made, and localized this very small foreign body in its relation to the wound of entrance, which was the only localizing point that could be utilized, being situated at about the middle of the arm. By this time the sensory disturbances had disappeared to some extent, although the patient complained of them at times when he attempted to use the arm, and still in the distribution of the ulnar nerve. There was slight tenderness over the site of the wound. On exposing the region where the foreign body had been localized a large nerve presented itself, and on examining it closely it seemed at one point to be a little swollen and injected. By probing with a pair of fine forceps Dr. Jopson found an opening in the nerve, and was able to remove the foreign body, which was deeply embedded and completely concealed in what proved to be the median nerve and not the ulnar. It was a thin scale, measuring 4 mm. in diameter. After the operation the patient had the same tingling sensations for 24 hours, but now in the distribution of the median nerve, that is, in the thumb, index and middle fingers, and not in the distribution of the ulnar nerve as formerly.

The reference of the pain to the distribution of the ulnar nerve, rather than to that of the median, was difficult to explain. The foreign body could not possibly have injured it, as the wound of entrance lay between the nerves.

Dr. George M. Dorrance said that he saw the case reported at the Polyclinic Hospital, and that he followed the patient from there to the Philadelphia Hospital, but lost track of him when his body was sent to the University. The report from the man who macerated the body was that the first cervical vertebra and part of the occipital bone was injured, and from his description of it one would imagine that the nerve was injured just as it came out from the anterior condyloid foramen. Therefore an operation would not have been of value, as it would have been impossible to reach the upper end of the nerve.